AD-A126 748 EJECTION INJURIES IN SOUTHEAST ASIA PRISONER OF WAR RETURNEES(U) AIR FORCE INSPECTION AND SAFETY CENTER NORTON AFB CA S T LEWIS 03 SEP 74 1/1

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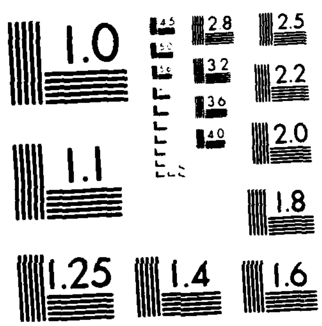

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"EJECTION INJURIES IN SOUTHEAST ASIA
PRISONER OF WAR RETURNEES"

by

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CLEARED
for open publication

3 Sep 1974

Directorate for Security Review (OASD-PA)
Department of Defense

Twelfth Annual SAFE Conference and Trade Exhibit

8-12 September 1974
Sahara Hotel
Las Vegas, Nevada

Sponsored by

SURVIVAL AND FLIGHT EQUIPMENT ASSOCIATION

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ABSTRACT

The ultimate test of life support equipment is its use under combat conditions. During the Southeast Asia conflict, some United States Air Force aircrews ejected and were captured. They have since been returned. Questionnaires were sent to the returnees to determine the effectiveness of their life support equipment. At the time this paper was being prepared, 209 of the 218 questionnaires completed by returnees documenting their pre-capture experiences had been received. From these 209 questionnaires, injuries occurring before, during, and after ejection were evaluated. There were 165 aircrews who entered hostile territory with some degree of injury, of which 78 had major injuries. The most common injuries were fractures/dislocations with ejection forces and wind-blast the most common causes of the injuries.

The United States Air Force (USAF) provides the best possible equipment for aircrews who support the USAF mission of flying and fighting. Research programs provide the best available weapons systems and training programs provide the expertise to use these systems. Unfortunately, there is always the corollary to flying and fighting and, that is, you have to expect losses. In the event that a weapon system is lost either due to mechanical failure or enemy fire, then the best possible life support equipment must be available to the aircrews to effect their safe escape from the aircraft and return to USAF control.

Data has been available on noncombat use of life support equipment and recommendations have been made to improve equipment based upon lessons learned from this experience. The ultimate test of our success in equipment design comes, however, when this equipment is used under combat conditions. During the Southeast Asia (SEA) conflict, many crew members were forced to abandon their aircraft and were successfully rescued. A series of papers presented at the Tenth Annual Survival and Flight Equipment Symposium covered this experience (1,2,3). Some of our aircrews were not successfully rescued and became prisoners of war. Fortunately, these aircrews have been returned.

The information provided by these returnees fills a void in our understanding of the use of life support equipment in combat. Unfortunately, the story of those killed in action will not be known so that we cannot tell what or how the system failure occurred.

My portion of the evaluation of the data obtained from 209 returnees deals with injuries occurring before, during, or after the escape from the aircraft. As you know, this information was obtained from anonymous questionnaires sent to the returnees. This means that the returnee defined his injury. In no way did I examine the individual or confirm the injuries. The medical evaluation of returnees is a thorough comprehensive program which is the responsibility of the Aerospace Medical Division, USAF School of Aerospace Medicine, Brooks Air Force Base, Texas. My discussion is centered on what the returnee indicated his injuries were and how this affected his ability to escape.

The data from Table I shows that 78 (38%) returnees entered the evasion phase of their shoot down with a major injury. In some instances, there was more than one major injury, whereas in other instances there was a combination of major and minor injury. These individuals were severely compromised in their ability to escape and evade. On the

other hand, 87 (41%) received minor injuries and 42 (20%) received no injuries during their escape from the aircraft.

The types and causes of major injuries are tabulated in Table II. There were 100 major injuries in the 78 returnees who received these types of injuries, with 13 individuals reporting multiple injuries and cause agents. Fractures, sprains, strains, and dislocations were the most common injuries occurring 86 times, with fractures being the most frequent in this group (74). This is not too surprising considering the environment under which the escape occurred. The most frequently fractured bones were the vertebral bodies (34), with ejection forces as the most common cause of these fractures (23). However, parachute landing fall was the cause in four cases. Lower extremity fractures occurred 23 times and upper extremity fractures, 16 times. The fractures to the upper and lower extremities seriously hamper, if not completely negate, an individual's ability to evade. In addition to the fractures, there were 12 instances of sprains/strains and dislocations of the extremities. Thus, of the 100 major injuries, the extremities were injured most frequently (47).

Ejection forces (23) and windblast (25) were the most frequent causes of major injury. This can be attributed to the catastrophic destruction of the aircraft, so that

the crew member did not have the opportunity to assume the proper ejection position or slow the aircraft. In order to keep these injuries in perspective, Table III shows that of 71 individuals who ejected at airspeeds of 450 knots or more, 30 received major injuries of which 13 were injured by windblast. As would be expected, Table IV shows that the most common injuries were fractures or dislocations of the extremities. Even more surprising is the fact that nine individuals ejected at speeds greater than 600 knots, with six receiving major injuries of which four could be attributed to high Q forces. Two individuals received only minor injuries from their high speed ejections and there was no record of injury on one individual.

Parachute landing fall was responsible for 13 major injuries. As would be expected, fractures and dislocations resulted with the lower extremities involved eight times. There were four vertebral injuries from this cause. One of these vertebral injuries was due to landing on the buttocks on a tile roof.

Major injuries due to shrapnel or other debris in the cockpit were not a problem. In only one case did shrapnel cause a major injury. However, generalized burns secondary to aircraft fire occurred five times. In five cases, the individual was knocked unconscious, which

resulted in retrograde amnesia in four individuals. Shrapnel and aircraft fires were a frequent cause of minor injuries. As an example of the extreme environment to which the aircrews were subjected, one individual received a broken arm and shrapnel wounds when the aircraft was struck by a SAM missile. He was thrown from the aircraft, and during parachute opening shock, he received a broken rib because the parachute chest strap was over the lensatic compass, and a dislocated hip due to a loose parachute harness.

DISCUSSION

Survival in a hostile environment is difficult, to say the least, for an uninjured crew member. For an individual who is injured, the chances of survival are inversely proportional to the degree of injury. That is to say, the greater the injury, the less chance for survival. In this present evaluation, 165 aircrews entered hostile territory with some degree of injury. Their chances of escape were already reduced because of their injuries. Certainly some individuals were not injured, yet were captured. It is impossible to escape if you should happen to land in the midst of the enemy.

Our life support equipment and ejection systems have performed admirably under combat conditions. However,

we should strive for a zero injury rate during aircraft escape and parachute landing. It is apparent that ejection forces and windblast have been the two prime causes of major injury in our returnees. Much has been done to reduce the injury potential of our ejection systems. It appears that more must be done to further improve these systems. During combat conditions, many aircrews cannot assume a proper ejection posture. It appears that improvement of restraint systems could help resolve this problem. Certainly improved seat design could reduce flail injuries from high speed ejections. An advanced ejection seat has been man-rated and is available for use in future high performance aircraft. The lessons learned from our combat experience must be applied to the design and development of future escape systems and life support equipment.

REFERENCES

1. Lehman, Charles A.: Use of Survival Equipment in USAF SEA Escape and Evasion Episodes. Life Sciences Division, Directorate of Aerospace Safety, Air Force Inspection & Safety Center, Norton AFB, California, 1972.

2. Munson, Herbert G.: Escape and Evasion Problems in SEA. Life Sciences Division, Directorate of Aerospace Safety, Air Force Inspection and Safety Center, Norton AFB, California, 1972.

3. Shannon, Robert H.: Rescue and Recovery of Downed USAF Aircrew Members in SEA, 1 Jan 63 - 31 Dec 71. Life Sciences Division, Directorate of Aerospace Safety, Air Force Inspection and Safety Center, Norton AFB, California, 1972.

TABLE I

SEVERITY OF INJURY TO PERSONNEL

Type of Injury	No.	%
Major	78	38
Minor	87	41
None	42	20
Unknown/Not Reported	2	1
TOTAL	209	

TABLE II

TYPES AND CAUSES OF MAJOR NONFATAL INJURIES

Major Injury Type	CAUSE OF INJURY: Ejection Forces	Parachute Landing Fall	Windblast/ Flailing	Seat-Man Chute Involvement	Aircraft Fire	Struck Aircraft Parts	Chute Opening Shock	Unknown/ Not Reported	Other	Total
Fractures	23	12	15	2	0	1	2	15	4	74
Skull	0	0	0	1	0	0	0	0	0	1
Foot/Ankle	0	5	0	0	0	0	0	1	1 Blast	7
Leg	0	2	7	1	0	1	0	5	0	16
Arm/Shoulder	0	0	7	0	0	0	0	3	2 Blast	12
Vertebrae	23	4	0	0	0	0	1	5	1 Crash Land	34
Ribs	0	1	1	0	0	0	0	0	0	2
Other	0	0	0	0	0	0	1	1	0	2
Sprains/Strains/ Dislocation	0	1	10	0	0	0	1	0	0	12
Arm/Shoulder	0	0	7	0	0	0	0	0	0	7
Leg/Knee	0	1	3	0	0	0	1	0	0	5
Penetrating Injury	0	0	0	0	0	0	0	0	1 Shrapnel	1
Burns - Generalized	0	0	0	0	5	0	0	0	0	5
Cerebral Concussion	0	0	0	0	0	1	0	4	0	5
Unknown/Not Reported	0	0	0	0	0	0	0	3	0	3
TOTALS	23	13	25	2	5	2	3	22	5	100

NOTE: 13 crew members reported multiple major injuries/cause agents.

TABLE III

INDICATED AIRSPEED AT TIME OF EJECTION BY INJURY TO PERSONNEL

*IAS (Knots)	TYPE INJURY Major	Minor	None	No Record	Total
0-99	3	5	2	0	10
100-199	3	4	2	0	9
200-299	6	11	9	1	27
300-349	4(1)	11(1)	6	0	21
350-399	4	6	0	0	10
400-449	5(1)	8(1)	1	0	14
450-499	4(1)	10	4	0	18
500-549	13(5)	13(2)	6	0	32
550-599	7(3)	3(1)	2	0	12
600 +	6(4)	2	0	1	9
Subtotal	55(15)	73(5)	32	2	162
Unknown	23(1)	13(1)	9	0	45
Total	78(16)	86(6)	41	2	207

*Indicated Airspeed

NOTE: Figures in parentheses indicate injuries due to windblast.

TABLE IV

PERSONNEL WITH MAJOR INJURIES ATTRIBUTED TO WINDBLAST

Case Number	Injury Type	IAS (Knots)	Altitude (Feet)	Method of Ejection Initiation
1	Fractured Leg Fractured Elbow	550	3,000	Sidearm
2	Fractured Arm	600	4,000	Sidearm
3	Fractured Leg	550	5,000	Sidearm
4	Fractured Arm Dislocated Shoulder	525	4,000	Sidearm
5	Fractured Arm Fractured Leg	400+	6,000	Not Reported
6	Torn Shoulder Tendons	450	3-5,000	Sequenced
7	Fractured Rib Dislocated Shoulder	500+	1,000	Sidearm
8	Fractured Legs, Bilaterally	525	1,000	D-ring
9	Fractured Arm	620	800	D-ring
10	Fractured Forearm Fractured Upper Arm Dislocated Knee	500	2,000	Sidearm
11	Fractured Legs, Bilaterally	600+	6,000	Sidearm
12	Dislocated Shoulder Knee Injury	600+	500-1,000	D-ring
13	Torn Knee Ligaments	500+	2,000	Sidearm
14	Dislocated Shoulder	570	1,500-2,000	Sidearm
15	Dislocated Shoulder	300	4,500	D-ring
16	Dislocated Shoulder	Unk	1,000	D-ring

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